Ricin

Bioterrorism Agent Profiles for Health Care Workers

Causative Agent:

Ricin is a potent protein toxin derived from *Ricinis communis*, the castor bean plant

Route of Exposure:

Inhalation, Ingestion

Infective Dose & Infectivity:

The LD_{50} of ricin is 3-5 μg/KG.

Incubation Period:

The incubation period ranges from 18-24 hours.

Clinical Effects:

When inhaled, initial symptoms include weakness, fever, cough, and hypothermia. Eighteen to twenty-four hours after exposure, the patient may experience hypotension, cardiovascular collapse and pulmonary edema. Thirty-six to seventy-two hours after exposure, severe respiratory distress and death from hypoxemia may occur. If the toxin is ingested, there is a rapid onset of nausea, vomiting, abdominal cramping, fever, and severe diarrhea with vascular collapse. Death generally occurs on the third day or later.

Laboratory testing:

Routine labs are usually non-specific. Neutrophilic leukocytosis was reported 12-18 hours after lethal intentional IM injection of ricin. Based on animal studies, ELISA or immunohistochemical techniques may be helpful in confirming ricin intoxication. If ricin intoxication is suspected, the following medical sample collections are recommended:
0-24 hours post-exposure: nasal swabs, induced respiratory secretions for PCR, serum for toxin assay
36-48 hours post-exposure: serum for toxin assay, tissue for immunohistological stain
>6 days post-exposure: serum for IgM and IgG in survivors

Lethality:

The mortality rate due to ricin intoxication is high.

Transmissibility:

Ricin cannot be transmitted from person to person.

Primary contaminations & Methods of Dissemination:

Likely methods of dissemination are via aerosolization or sabotage of food supply.

Secondary Contamination & Persistence of organism:

Ricin is not volatile. Secondary aerosols are not a danger.

Decontamination & Isolation:

Patients- Patients should be treated using standard precautions. If the exposure is through ingestion, activated charcoal is appropriate.

Equipment, clothing & other objects- Soap and water or 0.1% sodium hypochlorite can be used for decontamination.

Treatment:

Treatment is supportive, and should include management for pulmonary edema. It is also important to replace volume due to GI fluid losses.

Prophylaxis:

There is no known prophylaxis for humans.

Differential Diagnosis:

In the case of ingestional ricin intoxication, fever, gastrointestinal involvement and vascular collapse are prominent, the latter differentiating it from enteric pathogens. In the case of inhalational ricin intoxication, non-specific weakness, fever, vomiting, cough, hypothermia and hypotension suggest several respiratory pathogens. Temporal onset of botulinum intoxication would be similar, but includes ptosis and general muscular paralysis with pulmonary effects.

References:

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